CLAIMS:

1. A multilayer structure comprising,

a plurality of at least two alternating layers A and B represented by formula $(AB)_x$, where $x = 2^n$, and n is in the range of from 4 to 15;

wherein layer A is comprised of component (a) and layer B is comprised of component (b); and

wherein the refractive index of said component (a) or component (b) can be varied by tensile, compressive or shear force.

CLAIMS:

2. A multilayer structure comprising,

a plurality of at least two alternating layers A and B represented by formula $(AB)_x$, where $x = 2^n$, and n is in the range of from 4 to 15;

wherein layer A is comprised of component (a) and layer B is comprised of component (b); and

wherein the refractive index of said component (a) or component (b) can be varied by tensile, compressive or shear force.

3. The multilayer structure of Claim 1, wherein component (a) is a glassy polymer and component (b) is an elastomeric polymer.

4. The multilayer structure of Claim 1, wherein component (a) is an elastomeric polymer and component (b) is a different elastomeric polymer.

5. The multilayer structure of Claim 1, comprising a plurality of at least three alternating layers A, B and C, represented by formula $(ABC)_x$, wherein layer A is comprised of component (a), layer B is comprised of component (b) and layer C is comprised of component (c); and wherein said components (a), (b) and (c) may be the same or different provided that the refractive index of at least one of components (a), (b) or (c) can be varied by tensile, compressive or shear force.

6. The multilayer structure of Claim 1, wherein said multilayer structure contains at least 30 layers.

7. The multilayer structure of Claim 1, wherein the thickness of each layer is in the order of from 5 nanometers and 650 nanometers.

8. The multilayer structure of Claim 1, which includes a tie layer (T) between layer A and layer B; said multilayer structure represented by formula $(ATBT)_xA$, where $x = 2^n$ and n is the number of multiplier elements.

9. The multilayer structure of Claim 1, which includes a barrier layer.

10. The multilayer structure of Claim 1, which includes a surface layer on at least one major surface thereof.

11. The multilayer structure of Claim 1, wherein said multilayer structure is a film or a sheet.

12. The multilayer structure of Claim 10, wherein the thickness of said film or sheet is in the range from 0.1 to 1000 mils.

13. The multilayer structure of Claim 2, wherein said glassy material is selected from the group consisting of a polyethylene naphthalate, a polyethylene naphthalate isomer, a polyalkylene terephthalate, a polyetherimide, a styrenic polymer, a polycarbonate, a poly(meth)acrylate, a cellulose derivative, a polyalkylene polymer, a fluorinated polymer, a chlorinated polymer, polyvinylacetate, a polyether-amide, a styrene-acrylonitrile copolymer, styrene-ethylene copolymer, poly(ethylene-1,4-cyclohexylenedimethylene terephthalate) and bleds thereof.

14. The multilayer structure of Claim 12, wherein said polyethylene naphthalate isomer is selected from the group consisting of 2,6-, 1,4-, 1,5-, 2,7-, and 2,3-polyethylene naphthalate; the polyalkylene terephthalate is selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate, and poly-1,4-cyclohexanedimethylene terephthalate; the polyimide is a polyacrylic imide; the styrenic polymer is selected from the group consisting of atactic polystyrene, isotactic

polystyrene, syndiotactic polystyrene, α-methyl-polystyrene, and para-methyl-polystyrene; the polycarbonate is bisphenol-A-polycarbonate (PC); the poly(meth)acrylate is selected from the group consisting of poly(isobutyl methacrylate), poly(propyl methacrylate), poly(ethyl methacrylate), poly(methyl methacrylate), poly(butyl acrylate) and poly(methyl acrylate); the cellulose derivative is selected from the group consisting of ethyl cellulose, cellulose acetate, cellulose propionate, cellulose acetate butyrate and cellulose nitrate; the polyalkylene polymer is selected from the group consisting of polyethylene, polypropylene, polybutylene, polyisobutylene and poly(4-methyl)pentene; the fluorinated polymer is selected from the group consisting of perfluoroalkoxy resins, polytetrafluoroethylene, a fluorinated ethylene-propylene copolymer, polyvinylidene fluoride and polychlorotrifluoroethylene; the chlorinated polymer is selected from the group consisting of polydichlorostyrene, polyvinylidene chloride and polyvinylchloride.

15. The multilayer structure of Claim 2, wherein said elastomeric polymer is selected from the group consisting of poly(ethylene-octene), acrylic rubber, brominated isobutylene-isoprene, butadiene rubber, butadiene-styrene-vinyl pyridine, butyl rubber, chlorinated isobutylene-isoprene, a chlorinated polyethylene, chloroprene, chlorosulfonated polyethylene, epichlorohydrin rubber, a homopolymer with ethylene oxide, a copolymer with ethylene oxide, ethylene-propylene-diene, ethylene-propylene rubber, a fluorocarbon rubber, natural rubber, nitrile rubber, polyisoprene, polysulfide rubber, silicone rubber, styrene-butadiene, urethane rubber, blends and formulated rubbers thereof.

16. The multilayer structure of Claim 8, wherein said barrier is selected from the group consisting of hydrolyzed ethylene vinyl acetate, a copolymer of polyvinylidene chloride, a nitrile polymer, and nylons.

17. The multilayer structure of Claim 8, wherein said barrier layer is bonded using an adhesive material.

18. The multilayer structure of Claim 16, wherein said adhesive material is a maleic anhydride grafted polyolefin.

19. A method for forming the multilayer structure of Claim 1, comprising

extruding component (a) in an extruder (A) to form a melt stream (A) and component (b) in an extruder (B) to form a melt stream (B);

combining melt stream (A) with melt stream (B) in a feed block to form parallel layers (A) and (B);

advancing said parallel layers through a series of multiplying elements (n) to form the multilayer structure.